

SUBSTITUTE SPECIFICATION

(Marked-Up Version)

ANTI OIL LEAKAGE DEVICE FOR A MOTOR SHAFT

5

BACKGROUND OF THE INVENTION

1. Field of the Invention:

The present invention is related to an anti oil leakage device for a motor shaft and especially to a leakage resistant structure of a fan motor shaft.

10 2. Brief Description of Related Art:

Referring to Fig. 1, the conventional anti oil leakage for a fan includes a fan frame 11 and fan blade wheel 12. The fan frame 11 ~~further includes~~ provides a hub base 111[[,]] which has with a hollow bearing seat 112[[,]] and the bearing seat 112 fits at the outer side thereof
15 externally fitting with a stator 13 and internally receiving receives
~~at the inner side thereof~~ a retaining ring 15, a ~~bearing~~ bearing 16 15 and an O-ring 17. The fan ~~blade~~ blade wheel 12 has a hub 121 and fan blades 122. The hub 121 receives a rotor 18 and is provided with a shaft 123 at the center thereof to pierce the O-ring 17, the bearing 16[[,]]
20 and the retaining ring 15 successively so that the fan blade wheel 12 can be ~~pivotaly~~ movably joined to the fan frame 11 in the ~~hub~~ base 111 and the lubrication oil can be prevented from leaking out due to being sealed with the O-ring 17.

A problem of the preceding conventional anti leakage structure
25 resides in that the O-ring 17 is made with inconsistent tolerances, which result in excessively large clearance between the shaft 123 and the O-ring 17, so that the lubrication oil leaks out through the clearance.

Further, Taiwan Utility Model Publication No. 365482, which is
30 entitled "ANTI OIL LEAKAGE DEVICE FOR A MOTOR SHAFT", discloses a main body with a locating seat and a hollow bearing sleeve ~~projects~~ projecting

from the locating seat. The bearing sleeve provides ~~inside thereof a~~
~~an inner self-lubrication bearing, and outside thereof a~~ an outer coil
and a circuit board. A blade seat provides ~~at the inner side thereof~~
a magnet at the inner side thereof and ~~provides at the periphery thereof~~
5 blades at the periphery thereof. A shaft is disposed in the blade base
to pierce through the self-lubrication bearing. The rear side of the
bearing sleeve fits with a covering tightly and the front side of the
bearing seat has an endplate with an inner bent hook end. The lubrication
oil released from the self-lubrication bearing can be ~~resisted~~
10 prevented from leaking out ~~with~~ via the end plate and the hook end
effectively. Further, an oil reservation ring~~[[,]]~~ ~~which is disposed~~
~~near the hook end[[,]]~~ is provided on the shaft near the hook end to
prevent the lubrication oil ~~coming from~~ out of the self lubrication
bearing from flowing outward along the shaft. In addition, an oil storage
15 groove with fiber coil is formed between the self lubrication bearing
and the end plate so that the oil released from the self lubrication
bearing can be reserved and soaked in the fiber coil to implement oil
reservation such that it is capable of prolong the life span of the
motor.

20 However, a problem of the preceding prior art is that it is high
~~for the production cost~~ but ~~and it is low not high or the perfection~~
rate due to it is required to make the hook end having to be made. Besides
~~Next~~, the oil reservation ring on the shaft ~~not only~~ increases not only
the production cost and fabrication process but also ~~increases~~ the
25 friction force, which results from the oil reservation ring moving
upward to frictionally contact with the hook end, while the oil
reservation ring rotates with the shaft ~~rotates~~ such that the motor
may run ineffectively to lower the life span thereof. Furthermore, the
oil ~~accumulation~~ occupying a space~~[[,]]~~ ~~which is~~ located at the upper
30 end of the shaft sleeve~~[[,]]~~ and it is very easy to occur result in
oil leakage during the shaft rotating.

SUMMARY OF THE INVENTION

An object of the present invention is to provide an anti oil leakage for a motor shaft, in which ~~an untouched minimum a clearance is formed~~
5 ~~between a projection part~~ an annular plate member at the upper end of the bearing seat and the shaft is smaller than molecular structure of the lubrication oil to result in capillarity being broken, so that the lubrication oil is ~~not admitted to pass~~ incapable of leaking outward via the minimum clearance so as to prevent the lubrication oil from
10 ~~leaking out.~~

Another object of the present invention is to provide an anti oil leakage device for a motor shaft, in which a stop piece ~~is used for fitting~~ fits with the opening of the bearing seat tightly and an ~~untouched minimum a clearance can be formed~~ between the stop piece and
15 the shaft is smaller than molecular structure of the lubrication oil to result in capillarity being broken, so that the lubrication oil is ~~not admitted to pass~~ incapable of leaking outward via the minimum clearance so that the lubrication oil can be prevented from leaking
20 ~~out.~~

BRIEF DESCRIPTION OF THE DRAWINGS

The detail structure, the applied principle, the function and the effectiveness of the present invention can be more fully understood with reference to the following description and accompanying drawings,
25 in which:

Fig. 1 is a sectional view illustrating the bearing device of a the conventional motor;

Fig. 2 is an exploded perspective view of the first preferred embodiment according to the present invention;

30 Fig. 3 is a disassembled sectional view of the first embodiment shown in Fig. 2;

Fig. 4 is an assembled sectional view of the first embodiment shown in Fig. 3;

Fig. 5 is a disassembled sectional view of the second preferred embodiment according to the present invention; and

5 Fig. 6 is an assembled sectional view of the second embodiment shown in Fig. 6 5.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figs. 2, 3 and 4, the first embodiment according to
10 the present invention at least includes a fan frame 21 and a fan blade wheel 22. The fan frame 21 at least includes a motor base 211 with a bearing seat 212, which is integral with the motor base 211. The bearing seat 212 at the upper end thereof integrally provides a projection an annular plate shaped stop member 2121 with a central hole along the
15 axial direction thereof and the lower end thereof is an open end 2122. The stator 23 fits with the bearing seat 212 and surrounds the outer surface of the bearing seat 212. A bearing 24, a retaining ring 25 and a durable pad 26 are placed in the bearing seat 212 via the lower end 2122 and a sealing plug 27 is tightly joined to the lower end 2122.
20 The fan blade wheel 22 has a hub 221 and a plurality of fan blades 222 extending from the periphery of the hub 221. The hub 221 has ~~at the inner side thereof~~ a rotor 28 and a shaft 29 at the inner side thereof and the shaft 29 provides an annual recess 291.

Further, the sealing plug 27 is provided with an inner groove 272
25 and an outer ~~annual~~ annular recess 2711. An elastic ring 273 fits with the outer ~~annual~~ annular recess 2711. Once the sealing plug 27 engages with the lower open end 2122 of the bearing seat, the elastic ring 273 can be disposed between the inner wall of the bearing seat 212 and the outer surface of the sealing plug 27 with no clearance in between. Hence,
30 the sealing plug 27 is capable of covering the lower open end 2122 tightly such that the inner groove 272 is formed as an oil storage zone at the

lower open end 2122.

During assembling the fan frame 21 and the fan blade wheel 22, the shaft 29 pierces the ~~projection part~~ stop member 2121 at the upper end of the bearing seat 212 and then passes through both the bearing 24 and the retaining ring 25 so as to press against the durable pad 26. The fan blade wheel 22 is rotationally connected to the fan frame 21 by way of the retaining ring 25 engaging with the annular recess 291 of the shaft 29 and the rotor 28 can magnetically connect with the stator 23 such that ~~an untouched~~ a minimum very small clearance is formed between the shaft 29 and ~~the end of the projection part~~ stop member 2121 is formed.

When the shaft 29 rotates to allow lubrication oil in the inner circular groove 272 of the sealing plug 27 moving upward along the shaft 29 due to capillarity, the lubrication oil is viscous and the ~~untouched~~ minimum very small clearance between the shaft 29 and ~~the end of the projection part~~ stop member 2121 is still smaller than the molecular structure of the lubrication oil. In this way, the capillarity is broken ~~to resist~~ and the lubrication oil from is incapable of moving upward and ~~it is capable of preventing the lubrication oil from leaking outward~~. Further, it is possible for the lubrication oil to flow back to the oil storage zone and keep the storage zone being full of oil. Hence, ~~it is able to prolong~~ life spans of the shaft 29 and the bearing 24 can be prolonged due to sufficient lubrication being obtained between the shaft 29 and the bearing 24.

Referring to Figs. 5 and 6, the second embodiment of the present invention are illustrated and it can be seen in Figs. 5 and 6 that the integral structure and function of present embodiment is similar to the first embodiment and the identical parts with the same designated numbers will not be explained again. The difference of the present embodiment from the first embodiment is in that the bearing seat 312 has ~~at the upper end thereof~~ an opening 3121 at the upper end thereof

and ~~forms at the lower part thereof a~~ an inner groove 3122 at the lower
end thereof[[,]]. The inner groove 3122 ~~which~~ is defined as an oil
storage zone. A An annular plate shaped stop piece member 37, which
engages with the inner side of the opening 3121 tightly, is provided
5 with a through hole 371 for being pierced with the shaft 29 so as to
allow the fan blade wheel 22 being movably connected to the fan frame
pivotally. ~~An untouched minimum~~ Similarly, a clearance is formed
between the stop piece 37 and the shaft 29 is formed to be smaller than
molecular structure of the lubrication oil such that capillarity of
10 ~~for preventing~~ the lubrication oil is broken and the lubrication oil
is incapable of in the oil storage zone from leaking outward as well.
Further, and it is capable of allowing the lubrication oil is capable
of to flow flowing back to the oil storage zone.

While the invention has been described with referencing to
15 preferred embodiments thereof, it is to be understood that
modifications or variations may be easily made without departing from
the spirit of this invention, which is defined by the appended claims.